SCIENCE.

FRIDAY, NOVEMBER 6, 1885.

COMMENT AND CRITICISM.

THE SCHOOL OF INSTRUCTION of the signal service at Fort Myer has been the scene of occurrences which show in a strong light the incongruity of having the weather service under military control. Some years since, General Hazen made known his desire to have educated young men, especially college graduates, enter the signal service as privates; and, under the promise of good treatment, he seems to have been quite successful in recruiting his corps from this class. The recruits are, however, required to learn the drill and duties of the common soldier. In this branch of their education, the class now under instruction proved so inapt that the drill-officer lost his patience and his temper, and expressed his sentiments in language unfit for ears more polite than those of the mules on the plains. The aggrieved young men wrote a letter of complaint to the chief signal officer, and for this offence they were promptly brought before a court-martial. The trial has been concluded, but the result has not yet been made known.

The case is instructive as showing the wide divergence between military discipline and common sense. While the young men were tried by court-martial, the officer whose ungentlemanly conduct caused the trouble was let off by what General Hazen is pleased to call a reprimand, but which was nothing more than a letter calling his attention to a certain paragraph in the army regulations. We can hardly suppose that this letter would seriously disturb the equanimity of an officer of the breeding indicated by the language of the offending lieutenant. Common sense would have dictated the trial of the officer by court-martial, and the reprimand of the men whose offence, as General Hazen himself says, was only that of going about a right act in a wrong way. We may admit that the chief signal officer knows best how so purely technical an offence against military discipline should be dealt with in army practice; but this only emphasizes the deviation of that practice from common sense when applied to a civil service like that of the weather bureau.

IN THE ANNUAL REPORT of the chief signal officer, just issued, it is claimed that meteorological work depends upon an accurate and continuous record, and that to get these conditions the observers must be held with an absolute control, which makes a military organization indispensable. It is further stated that the gathering of these observations is traditionally military work, and that "all that is of much value has been done under some form of military organization." While not wishing to disparage the faithfulness of the meteorological records of our own army surgeons, which are referred to as among the earliest, we think it must be acknowledged that the aimless records of temperature and barometric pressure of the past were made by those having much spare time upon their hands, whether surgeons at army posts or civilians. But meteorology is not a mere question of gathering records of observations. These records must be discussed, and the truths hidden in these masses of figures must be revealed, before any true science exists. We find that this need is recognized by the Army signal service, and that Professors Ferrel, Abbe, Trowbridge, Rowland, Pickering, Mendenhall, Wright, not to mention other younger men, and all civilians, have been employed as a 'study division' to improve the methods of taking observations and the instruments used, to prepare text-books on meteorology and meteorological instruments for the use of the service; in fact, to direct the whole work of the bureau. We do not forget the officers of the army who have done good work for the service and for science, but merely wish to call attention once more to the fact that the proportion of men fitted to conduct scientific work is small, and no larger among army officers than among civilians. There is, moreover, no evident connection between predicting the coming of a killing frost which will destroy the last of a growing cotton crop, a matter treated of in the latter part of the report, and skill in laying a field telegraph line, military signalling or drill, to which are devoted the opening pages. It is inevitable that the larger portion of the leaders of the service must be civilians. The work of the service is done for the benefit of commerce and agriculture, and it is in-

congruous that it should be in the hands of army officers.

We notice with much pleasure the election of Prof. E. S. Holden to be president of the university of California, and director of the Lick observatory. Professor Holden's resignation as director of the Washburn observatory at Madison, Wis., takes effect on the 1st of January next. His appointment as director of the Lick observatory will hardly be a matter of surprise to those who are aware that, as consulting astronomer, he has virtually had the direction of the work as it has progressed, visiting the site on Mount Hamilton in 1881, and again in 1883 and 1884. Very happily the choice both of the Lick trustees and of the regents of the university has fallen upon Professor Holden. It is understood that in his letter of resignation to the regents of the university of Wisconsin, he strongly urges the name of Prof. W. A. Rogers, of Harvard college observatory, as his successor.

The creation of a new chair of psychology at the Sorbonne, and the instalment therein of M. Th. Ribot, editor of the *Revue philosophique*, as professor, marks a new epoch in the relation of the university to philosophy in France, and is a most gratifying proof of the way in which the world moves. Safe opinions and literary smoothness have, for almost as long as any one now can remember, been stronger passports to French philosophic professorships than either learning or originality. But the renewal of the science of human nature by the physiologists, pathologists, and evolutionary anthropologists of this day and generation, has brought too great a mass of new facts with it, and of new conjectures, for any barriers to stand. They must be let in somehow, and officially taught and discussed, if the official teaching is not to appear ignorant and antiquated. The Ministry of public instruction has wisely seen this, and has had the sagacity to choose for the new professor the man who has done most to introduce the new ideas to his countrymen. M. Ribot's place at the head of the *Revue philosophique* is, to be sure, more important than any professorship; and a professorship would be but a faint reward for the service he has done to French philosophy by his admirable management of that periodical. But the two functions do not exclude each other, and we wish M. Ribot health and strength for a long career in both.

There is no geographer, biologist, or ethnologist, probably no statesman, on the other side of the Atlantic, to whom the name of Justus Perthes is not full of meaning. It is not merely that the house has helped, by its publications, each in his profession. It is not only because, of all geographical chart-work, theirs is pre-eminently the most delicate, the most reliable, the most artistic in the taste with which colors are used. It is rather because to the operations of a firm of means, business ability, and pride in furthering geographical science, have been added the efforts of a succession of geographers who stood second to none in their specialties, and whose ambition was not merely pecuniary or personal. The founder of this house, Johann Georg Justus Perthes, was the son of the physician to the Prince of Rudolstadt, and was born September 11, 1749. He engaged in a commercial enterprise, out of which, in September, 1785, the establishment at Gotha originated. Since then, after the death of the founder, the business has been carried on by Wilhelm (1816–1853), Bernhardt (1853–1857), and by Adolf Muller and Rudolf Besser, on behalf of a posthumous son of Bernhardt Perthes and others interested, nearly to the present time. In September last the centenary of the establishment was celebrated, and a jubilee-volume, elegantly printed, and illustrated with portraits of the firm and its chief collaborators, has been distributed to its associates and friends. This volume contains a brief history of the firm, of its connection with geographical literature, with geographers, and with explorers. The part it has played in these matters redounds to the honor of all concerned. A table showing the present organization is appended. It is unnecessary to go into details with which most of our readers are more or less familiar already. It is sufficient to say that a house to which we owe the works of Berghaus, Stieler, Petermann, Spruner, Behm, and their associates, must be counted among the ornaments of the German fatherland and the efficient forces of civilization.

PASTEUR AND HYDROPHOBIA.

The recent communication of M. Pasteur to the Academy of sciences, upon the prevention of hydrophobia by inoculation, has naturally aroused great interest among the general public as well as in the scientific world. The methods and results of his experiments upon this subject have not yet been published with sufficient detail to justify any

positive judgment or intelligent criticism concerning them. If correctly reported, Pasteur is convinced that he has discovered means by which the virus of hydrophobia can be attenuated, and that, by the inoculation of the attenuated virus, individuals may be rendered, for the time being, insusceptible to the disease. The attenuation is said to be effected by preserving for a variable length of time pieces of the spinal cord of rabbits which have been inoculated with the hydrophobic virus. The longer the pieces of spinal cord are preserved, the weaker becomes the virus contained in them. It is evident that the spinal cord must be preserved in a manner not to decompose, and at the same time not to destroy at once, the hydrophobic virus. We are not informed how these ends are accomplished, but in accordance with Pasteur's doctrine of attenuation of virus, they must be reached without any obstacle to the free access of oxygen to the specimen. Of especial interest is the statement that inoculation with attenuated virus will prevent the outbreak of the disease, even when this inoculation is performed after the reception into the body of the strong virus by the bite of a rabid animal. There is no information as to whether this inoculation is effectual after the development of the symptoms of hydrophobia or not.

The conclusions of Pasteur, coming from so great an authority, will receive, as they deserve, respectful and serious consideration. It is understood that for no less than five years Pasteur has given the greater share of his time and labor to the study of hydrophobia. It is probable that his conclusions are based upon a large number of careful experiments upon animals. The two or three reported instances of preventive inoculation of human beings, which have excited such popular interest, and which have been reported with so much dramatic detail in the newspapers, can hardly lay claim to much scientific value in proof of Pasteur's views. Even if the number of reported cases were much larger, it would be necessary to use great caution in drawing from them positive conclusions, in view of the facts that the period of incubation of hydrophobia is very variable, and sometimes of many months' duration; that a considerable number of those bitten by rabid dogs never contract hydrophobia, even when no especial treatment has been adopted; and that there is great popular ignorance as to the symptoms and means of recognition of hydrophobia in dogs.

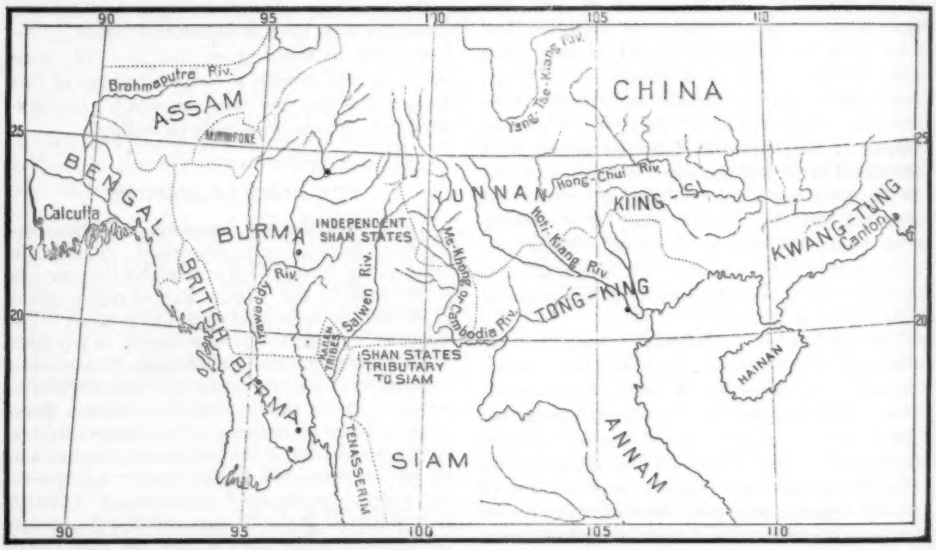
There is no evidence that the real nature of the hydrophobic virus has been discovered; indeed, we have, in June of the present year, the positive statement of Bouley, who is believed to be familiar with Pasteur's work, that no organism has been isolated or cultivated which can be considered to be the virus of hydrophobia, and that Pasteur's researches have been conducted without a knowledge of the biological properties of the suspected organism. The whole subject of immunity from disease by preventive inoculation is in a very unsettled state. We possess a mass of superficial observations and undigested conclusions on the subject, but we have very few positive and well-established facts. It is to be hoped that Pasteur's researches upon the inoculation and cure of hydrophobia will be found, when they are fully published, to add greatly to our knowledge of this subject, and that the blessings which are anticipated from his discovery may be realized.

THE BURMAN DISPUTE.

THE Bombay-Burma company, a British corporation having very important interests in Independent Burma, was ordered by the Burman government to pay twenty lacs of rupees (about $1,000,000) in respect of their forest leases. The company replied that it was unable to pay such an enormous sum, and, furthermore, that no such payment was required under any reasonable construction of the grants from the Burman king. Judgment was accordingly entered against it. The company appealed to the British government, and on the twenty-eighth of last August 'the officiating secretary to the chief commissioner of British Burma' wrote to the Burman minister for foreign affairs, reciting the facts as they are here given. He then proceeded to inform the Burman minister that the British government — not the chief commissioner, not the Indian Viceroy, but the British government — 'cannot acquiesce' in any such proceedings. He asked that all further actions against the company should be suspended, and proposed that the whole dispute should be referred to a person skilled in judicial matters, to be appointed by the Viceroy of India. He closed by requesting the Burman government to 'make a very early reply' to these three questions: (1) whether the decree would be suspended; (2) whether the matter would be submitted to arbitration; and (3) whether the Burman government would agree to abide by the arbitrator's decision.

To an unbiassed observer this proposition that the government of one of the parties to a dispute

should appoint an 'arbitrator' to whose decision the other party — in this instance an independent sovereign, so far as the British are concerned — should agree to abide, even before knowing the arbitrator's name, seems to possess features as objectionable as they are novel. The Burman government did not take kindly to the idea of exposing all the secrets of Burman mal-administration to the gaze of a foreigner, even though he possessed the confidence of the Viceroy of India. A reply was accordingly drawn up, and sent to Rangoon in the most insulting way that could be devised. One sentence will show the weight which the despot of Mandalay attached to the demands of the British government. "The chief commissioner is distinctly informed," so this strange letter reads, "that on no account will there be any suspension of any order or action which it may be necessary to pass or take against the Bombay-Burma company pursuant to the judgment of the shildaw on the timber case." If the affair did not involve the lives of thousands of innocent Burmans, and also, as will presently appear, the continued trade supremacy of the English in the east, this reply of the ruler of less than four million partially-civilized and poorly-armed persons to an official letter of a servant of the Empress of India would appear simply ridiculous.



The matter was placed in the hands of Lord Dufferin, the present viceroy; and after some delay an ultimatum was sent to King Theebaw. In it three demands are made: namely, (1) that a person sent by the chief commissioner of British Burma shall be received with all honor; (2) that all proceedings against the Bombay-Burma company shall be suspended, pending his investigation; (3) that a British resident with a sufficient guard shall be accepted. If the first two demands are not conceded before a certain day, 'action will be immediately taken.' In other words, if the monarch of Burma will not submit peaceably to demands which were just in the eyes of Lord Dufferin, he will be compelled to submit to them and to become a vassal of the Empress of India. There are two sides to every question, and in the present case it must be admitted that, from a Burman point of view, Theebaw, the Lord of the White Elephant, is acting entirely within his legal rights in confiscating to his own use any thing upon which he can lay his hands. It is hardly to be expected that the English would view the matter in the same light; and it should always be borne in mind that, as a late viceroy once said, when the English are attacked in their mercantile interests, they are wounded in their most irritable point; and the present issue involves not merely the ruin of a particular commercial corporation. It is a part of the contest for supremacy in the east, which began years ago, in 1746, when the French captured Madras, and of which the end is not yet.

The first thing that strikes the eye when directed upon a map of Indo-China is the fact that all the great rivers of this region — the Hong-Chui (Long River or River of Canton), the Hoti-Kiang (Son

Tai or Red River of Tong King), the Me-Khong or Great River of Cambodia, the Salwen, and the Irawaddy, all have their sources, with the possible exception of the Canton River, in the unknown mountain regions of southern Tibet. Another noticeable feature is a spur of the Tibetan ranges, which, extending southwards between the valleys of the Bramaputra and Irawaddy, completely interrupts direct overland communication between British India and the north-western provinces of China. Another important fact is that throughout this whole region, excepting, of course, the great deltas of the Irawaddy and Me-Khong, the river valleys are very narrow, the remainder of the country being little else than a confused mass of hills.

There is no regular overland communication between the interior and the seaboard over which bulky goods can be transported with any fair chance of profit. The rivers must be utilized to the greatest possible extent, and it is a singular fact, but a fact nevertheless, that only one of these five great rivers is capable of being navigated with profit by steamers of a suitable size. The Canton River abounds in rapids and difficult navigation, and at the end of his tedious boat journey the trader is still far from the coveted tea mart of Puerh in southern Yunnan, — a mart at which the best tea grown in China, the so-called Puerh tea, is distributed. The Son Tai, or Red River of Tong King, at first seemed to offer a solution of the problem; but on further investigation it has proved to be filled with rapids, and to run through a wild and savage country sparsely inhabited by hostile tribes; and, as every one knows, the French have found, at the cost of much blood and treasure, that Yunnan and Kwang-Si are as far off as ever. The Me-Khong, owing to its length alone, is obviously out of the question, while the Salwen is navigable for less than one hundred miles. The last river on the list is the great Irawaddy, which, rising in the unexplored fastnesses of Tibet, flows in a general southern direction, by Bamo (at the head of navigation), by Mandalay (the present capital of upper Burma, and incorrectly spelled Mandelay in our map), by Prome (at the end of the only piece of railway in either Burma), and by Rangoon (the capital of the British Province of Burma, and the seaport of the Irawaddy. Strictly speaking, Rangoon is on the Rangoon River; but as the whole country between Cape Negrais and the Salwen is one vast alluvial plain, in which the Irawaddy, Rangoon, Pegu, and Sittang intermingle in the most reckless confusion, it is not improper to speak of Rangoon as situated on the Irawaddy, with which it is in direct communication by a delta branch of this great river. Eight hundred and forty miles above the sea, Bamo (pronounced Bamaw) stands at the head of navigation, and only fifty miles away in a straight line is the Chinese frontier. The Irawaddy is thus the key to the trade of this part of the world, and the valley of the upper Irawaddy is Independent Burma. Can we wonder, then, that the English nation welcomes the excuse which the recent suicidal action of the Burman government has given it for taking possession of what will undoubtedly prove to be one of the most important trade routes of the world.

It may be said that I have overstated the desires of the English in this matter, and, to guard against any such reproach, a few sentences culled from the leading editorials of the London *Times* for October 15 and 17 are here introduced. The first is from the issue of the latter date, and is as follows: "It is as a high road to China that upper Burma is most valuable to us, and this road we shall now insist on keeping open, at any cost." The other quotation is somewhat longer, but is still more to the point: "Upper Burma is a strip of country interposed in the direct line between the eastern provinces of India and China. It is most important for our trading interest that the route between the two empires should be open. The establishment of another European influence [French?] in upper Burma could be regarded by the English only with dismay. But with the trade routes in English hands would come, not only trade, but, in time, not an alliance, but a friendly understanding between England and China,—two countries whose interests are identical, and whose enemies [Russia and France?] are the same." At first sight it may seem strange that such a valuable trade route should have remained unknown and closed to Europeans for so many years, and should have almost ceased to be used as a trade route within the past two decades. Yet such is the fact, though the causes of this strange development are not far to seek, and are to be found in the character of the races which inhabit upper Burma and south-western China.

With the exception of the regions surrounding the poles and a small portion of central Africa, there is probably no part of the earth's surface about which geographers are so ignorant as they are of the topography, hydrography, and ethnography of this part of Indo-China lying between the twentieth degree of north latitude and the sources of the Bramaputra and Yang-Tse-Kiang. It is known, however, that three routes lead from Bamo to Yunnan, and they have been traversed repeatedly in the last few years by Europeans, and will be found described in the books.

The Burmans are the ruling race of Burma, and, if we had space, would receive more than a passing

notice. As it is, however, we can only point out, that, separated as they are by lofty mountains, the Indians and Burmans have little in common; but the Buddhist religion, and the Buddhism of Burma, are said to differ in many essential points from that of India. Then, too, the caste distinctions of the one country do not obtain in the other, and, finally, the system of land tenure and administration in vogue in this part of the land of the white elephant, is unique in the institutional history of mankind. Any one interested in the subject is referred to a work in two volumes, entitled 'The Burman,' by an author who conceals his identity under the euphonious pseudonyme of Shway Yoe, and to the late Captain Forbes's invaluable work on British Burma.

If the Burmans are the rulers of the country as a whole, their hold on the tribes living between Bamo and the Yunnan frontier is very slight. On the hills nearest Bamo live the Kakhyens, a savage and godless people, who worship 'nats' and tyrannize over travellers. They are few in numbers, and, with the English once in possession of Bamo, could offer little opposition. Intermingled with them in Siam, and spreading thence to the south well into Siam, and to the east beyond the Chinese frontier, live the Shans, who are much more capable of civilization than the wild Kakhyens, and even now lead a peaceable and well-ordered life. The Shans seem to be related to the Siamese rather than to the Burmans, and, indeed, the southern tribes are tributary to Siam. So, too, in theory, are the Burman Shans tributary to Burma. In practice, however, it is not so, and the power of the Burman government, which grows rapidly less as one gets away from the despot's palace in the centre of Mandalay, becomes nothing long before the Yunnan frontier is reached. Indeed, some Shan tribes are reported as paying a nominal tribute to the rulers of both countries, while obeying neither.

Passing over the boundary, we come at once to that portion of Yunnan which for eighteen long years was the scene of the Mohammedan revolt against the Chinese yoke. At last, in 1874, this rebellion of the Panthays, as the Mussulmans are called in Yunnan, was finally crushed. In the course of the eighteen years of civil war, however, the country had been in great measure depopulated, its agriculture ruined, and its commerce paralyzed. Now, again, caravans are reported as arriving at Bamo. This part of our globe is so rich in the products of its soil, in the mineral wealth lying within easy reach, provided the cost of transportation was not so great, and in its splendid forests of teak and other hardwood trees, that there seems no doubt but that the first nation to penetrate to the interior, and build the necessary roads and railways, will for many years monopolize the trade of a large portion of Farther India. Edward Channing.

ÆSTIVATION OF MAMMALS, WHAT IS IT?

The occurrence of æstivation, or something considerably like it, is a possible mid-summer feature of the animal life in southern New Jersey; and yet I find no reference to the subject in any work descriptive of the habits of our fauna. What is æstivation? In Stormonth's dictionary, the definition is as follows: the sleep or dormancy of animals during the hot or dry season in warm climates; the analogue of hybernation in cold regions.

The condition of certain mammals, as reported to me during the summer of 1884, brought the subject prominently to mind, and I found that in past years I had made many memoranda concerning unconscious animals; but the full significance of which I did not, until recently, recognize; and indeed, I may not now correctly interpret the facts.

The following is an instance of the supposed occurrence of æstivation, or something closely akin to it:—

A family of white-footed mice was found in an exposed position in an open field; the nest being made of a few leaves and some thistle down, under an old tin pan, the bottom of which had nearly rusted away. When these mice were taken up—and they were handled with great care—they were found to be soft and warm, as when in full vigor, but gave no signs of life. The female mouse and her three young, which were more than half grown, constituted the family. As there was no apparent cause for the death of the mice, I determined to investigate the matter very carefully. One of the young was pricked on the ear with a needle, when it flinched slightly. The others were similarly tested, and all gave evidence of life to the same extent. Carrying these mice to a shady spot, and placing them in a comparatively cool position, they regained their ordinary activity in about seven hours; the process not appearing to be as gradual as it really was, but resembling closely the awaking from an ordinary sleep. They were then replaced in their nest in the field, which they promptly abandonded, but returned thereto, in the course of the next day. Three days later, these mice were found in precisely the same condition. Time, noon; thermometer 106° F. These mice were taken directly to a cellar, forty-two degrees cooler than the open field, and the sudden change proved too great a shock. The young died in one

hour; the old mouse, in less than three hours. Had these mice, after their first removal, when replaced in the field, directly become stupid or actually dormant, it might naturally be inferred that the heat had seriously affected them; but, as we have seen, such was not the case. During the evening of the day following my replacing them in the field, the air became cooler by twenty-nine degrees, by 7 P. M., and was thirty-four degrees cooler four hours later; and the mice were active and fed heartily upon bread crumbs placed near their nest. Now, why, it may be asked, did they not seek out a cooler retreat in the woods near by? I can only suggest that the supposed æstivating condition was not inconvenient or unpleasant, and that it was preferable to the abandonment of their nest, which was suited to their needs for all time, except such extraordinary spells of hot weather. Either these mice were excessively stupid, or a dormant condition, caused by excessive heat, was nothing unusual with them.

There is, in this instance, a marked difference from a hibernating sleep, in that the period of dormancy was of but a few hours duration; but was like the torpid slumber of a hibernating animal, in that the condition was one from which it was not possible to arouse them, as from ordinary slumber. The awakening had to come from a change of temperature, and just in proportion as the evenings were warm, the mice were tardy in returning to consciousness. To more effectually test this, I carefully removed these mice from the field, and placed them near a stove, so that the midday temperature could be maintained. The result was the continuance of the dormant condition for eighty-four hours.

When the effect of a protracted drought and heated terms upon our animals has been more fully worked out, I believe it will be found that many a mouse and other small mammal which is found lying dead as supposed, is really not in a moribund but dormant condition, and if left undisturbed, would revive. But what other evidence is there of this? The white-footed mice are not, of themselves, sufficient to prove that æstivation is an established habit. What other evidence among mammals have we?

In August, 1880, I found bats on four different occasions, all of which were apparently in full health, yet they did not, for some reason, which I supposed to be excessive heat then prevailing, resume, at sundown, their crepuscular flights at the usual hour. These bats had 'gone to roost' under leaves on trees and a grape-vine, and were, no doubt, fully intending to resume their activity after the nap of a day's length was over. Why did they not? The following days were excessively hot, until the fourth, which was a few degrees cooler. It clouded over early in the afternoon; soon it became damp, and just before the commencement of a passing shower, these bats were stirring a little, as they hung. Quivering their wings, as though to see if all was in working order, and then, away they flew, after, in each case, nearly ninety hours of rest. Does it adequately explain all the facts to say that these bats were overcome by the heat? They were resting in the shade during the whole day, and the nights, when they would be active, were cooler; but in these cases, very little cooler. They were nights to be remembered for their sultriness, and may it not be, that there was not sufficient difference in the midday and evening temperature to enable them to throw off the nervous prostration caused by the heat of the day? Explain it thus, and then we are left to consider what is this nervous prostration? In the case of the bats mentioned, they were all in a perfectly torpid state, and gave not the least sign of life when handled; and only flinched slightly, when wounded by being pricked with a needle. Would not nervous prostration that produced insensibility, lasting several hours, almost certainly produce death? In the case of the bats, a torpid condition of ninety hours produced no ill effects. I am disposed to believe that the coming hot and dry weather was anticipated, and these bats retired for the purpose of escaping it, and entered into a condition widely different from ordinary sleep, which was to last until the so-called heated term was over, the lowering of the temperature being the one means through which they would be restored to consciousness. There occurs this deliberate action on the part of certain mammals, which regularly hibernate—why should not the same be true of them when the extreme is one of heat, instead of cold?

As bearing upon this question, let me quote a few lines from the Encyclopedia Brittannica—ninth edition—article, Hibernation. It says: "The dormouse not only hibernates in the strict sense of the term, but will sleep at intervals for several days together, during mild weather. When a Myoxus, an allied animal inhabiting Africa, was brought to Europe, it hibernated as if this were its normal habit. Whether it æstivates in its native country is not known, but its hibernating in Europe shows a greater power of adapting itself to changed conditions of life than we should have been inclined to suspect."

I would briefly call attention to two points in the above: that in temperate climates prolonged sleep is not unknown among rodents; and also, that some tropical rodents probably æstivate. In the case of the white-footed mice, and, too, of the

bats, I am very positive that their condition was not that of ordinary slumber, and the tropical temperature, at the time, even through the night, certainly suggests æstivation as the most plausible explanation of the phenomena I have described.

C. C. Abbott.

THE LIFE OF GEN. EMORY UPTON.

General Emory Upton, at the time of his early death in 1881, was probably the most accomplished officer in the United States army. He had a genius for the science of military tactics, and, as a thinker and writer upon this subject, has left a name of enduring renown. General Michie, the well-known professor of physics at West Point, aided by General James H. Wilson, who was distinguished in the cavalry service during the civil war, has recently published an extended memoir of Upton, tracing the various steps of his advancement through boyhood, with his strong desire to go to West Point; through his cadet life, in which he won high rank; through his varied and arduous experience in the three branches of army service during the war, winning success in each; through his career as the commandant of cadets, as an instructor in artillery at Fortress Monroe, as an official observer and student of the armies of Europe and Asia, and especially as an authority on military principles and practice. General Wilson says of Upton, that he was "as good an artillery officer as could be found in any country, the equal of any cavalry commander of his day, and, all things considered, the best commander of a division of infantry in either the union or rebel army." This is high praise, but the volume by General Michie shows how such success was won, and leads us to believe that Upton's name, as years roll by, will be honored more and more as one of the greatest tacticians of modern times. His personal character was as remarkable as his professional. Like Havelock, Stonewall Jackson, Chinese Gordon, and many other heroes, he developed a religious life of the purest and most lofty type. Toward the end of his life he was engaged upon a study of the military policy of the United States during the revolution, and from that time down to the year 1862, when his manuscript ends. In this work he was associated with his classmate at West Point, Col. H. A. Du Pont, by whom the task will doubtless be completed. From the outline given by General Michie, it is clear that the treatise will be of the greatest value, not to military men only, but to all students of history, and especially to statesmen. It will throw a great deal of light on the causes of success and of failure in the various campaigns which have taxed the resources of our countrymen. The publication of this manuscript is greatly to be desired.

As a soldier and as a writer, Upton may be described as one who applied the principles of scientific method to the organization and management of armies. His aim was lofty; his success was great.

Life and letters of Emory Upton, Brvt. Maj.-Gen. U. S. army. By Peter S. Michie. With an introduction by Jas. Harrison Wilson. New York, *Appleton*, 1885. 28+511 p. 8°.

DOOLITTLE'S PRACTICAL ASTRONOMY.

Professor Doolittle has given us an excellent manual, either for the student or for the worker in the field. Intended only for field astronomy and navigation, we find no treatment of observatory methods with large instruments, but its own field is thoroughly covered. "The author has not sought after originality, but has attempted to present in a systematic form the most approved methods in actual use at the present time." It is a comfort to turn the pages and find standard formulæ in a familiar dress. Much of the 'originality' of many modern text-books consists in rigging out old accepted formulæ in a new alphabetical suit, so that no one can be quite sure he is using just the right one without constant reference to the great 'original.'

We can only give an outline of the contents. The introduction develops in a simple but thorough manner the method of least-squares and the subject of interpolation. The different systems of spherical co-ordinates, the formulæ for their transformation and for parallax, refraction, etc., are very completely developed. Under the subject of angular measurements, verniers, micrometer-microscopes, graduated circles and their sources of error, chronometers, clocks, and chronographs are fully described and investigated. With the treatment of the adjustments and errors of the sextant, is introduced an example of the determination of the eccentricity by star observations, from the work of Professor Boss on the northern boundary survey; and chapter v. develops thoroughly the best methods of determining time and latitude by the sextant or any altitude instrument. The transit-instrument in its various forms, both in the meridian and prime-vertical, is very fully treated; likewise the determination of longitude by chronometers, by telegraph, by lunar distances, by moon-culminations, and by occultations of stars. Of course, the zenith-telescope claims its due share of attention, and an unusually complete chapter

A treatise on practical astronomy, as applied to geodesy and navigation. By C. L. Doolittle. New York, *Wiley*, 1885. 8°.

on the determination of azimuth follows it. The book closes with a very full and clear setting-forth of the subjects of precession, nutation, aberration, and proper-motion, with the formulæ for their application, and a set of tables most useful to the field-astronomer in reducing observations.

The most valuable and characteristic feature of the book is the excellent series of examples taken from actual modern practice, which accompany almost every method of using each instrument, and are fully discussed by the method of least-squares where its application is advantageous. There is throughout an endeavor to impress the importance of developing the degree of accuracy inherent in the observations, and the best methods of avoiding or eliminating systematic errors. The whole work bespeaks the thorough master of his subject. The warning as to parts of the normal-equations solution not checked by the proof-formulæ, the giving of the complete values of the auxiliaries in the formulæ for the weight-coefficients out to four unknown quantities, and many other points which would be overlooked by the mere book-maker or pure theorist, show that Professor Doolittle has thoroughly beaten the whole ground, and knows where the difficulties lie.

The typography of the book is excellent, and Professor Doolittle's known thoroughness gives us assurance that much less than the usual number of mistakes will be found in the printed text.

MEXICAN ETHNOLOGY.

THE magnificent ethnologic museum of the Trocadéro at Paris is one of the sights of that great capital which no scientific visitor should overlook. It is particularly rich in its American department, and the conservator of the museum, Dr. Hamy, has taken a pride not only in collecting in this department, but in studying his specimens and in publishing the results of his studies. As editor of the excellent *Révue d'ethnographie* he has always at his command a medium to give them promptly to the world. He has collected a number of these studies under the title, 'Decades Americanæ.' They treat of such topics as 'An anthropolith from Guadelupe,' 'Fishing industry in ancient times in the Californian Archipelago,' 'The Tzompantli,' 'An Aztec arrangement for supporting skulls,' 'The American solar wheel,' 'A pipe from King's Mound, Ashland,' etc. All these articles are freely illustrated, and the specimens are described and discussed with clearness and from an astonishing width of special reading.

The 'Anthropology of Mexico' is a work of much more ambitious character. In this large and handsome quarto published by the French government, Dr. Hamy discusses the human remains that have been collected by French explorers in various portions of Mexico. He places them in relation with the oldest relics of the stone age from the same region, and reaches the conclusion that the implements, at any rate, point to a period and condition of human life exactly the same as existed in the United States and Europe during the epoch of unpolished stone. In the crania examined the principal characteristics were marked prognathism and brachycephalism. These traits the author thinks are especially pronounced in the skulls of the Otomis and Mazahuas. Besides the minute descriptions and abundant lithographic illustrations with which he enlightens his topic, he enters somewhat fully into the earliest legendary history of Mexican ethnography, attempting to define more closely the identity and relations of those mysterious people, the Quinamies, the Olmecs, and the Xicalancos. He wisely, however, treads with caution on this very uncertain ground.

Mission scientifique au Mexique et dans l'Amérique Centrale. Anthropologie du Mexique. Par. M. E.-T. HAMY. Paris, *Imprimerie nationale*, 1884. 4°.

Decades Americanæ. Mémoires d'archéologie et d'ethnographie Américaines. Par le Dr. E.-T. HAMY. Paris, 1884.

ASTRONOMICAL NOTES.

Longitude signals between St. Louis and Mexico. — Professor H. S. Pritchett, director of the observatory of the Washington university at St. Louis, kindly communicates the results of a longitude campaign between his observatory and the Observatorio nacional de Mexico, Sr. A. Anguiano, director. A preliminary discussion gives $35^m\ 57^s.25$ as the difference of longitude, or $6^h\ 36^m\ 46^s.41$ W. of Greenwich as the resulting longitude of the transit-circle piers of the Mexican observatory. This differs $5^s.0$ from the old value determined by moon-culminations. The circuit was 2583 miles long, with five repeaters, and the armature time was quite constant, averaging $0^s.38$. The outfit of the Mexican national observatory includes a 15-inch equatorial by Grubb, and an 8-inch meridian-circle, and a 6-inch transit, both by Troughton and Simms. The *personnel* consists of the director (Sr. Anguiano) and five assistants.

Comet observations at Greenwich.—The somewhat unusual appearance in the *Astronomische nachrichten* (2688) of comet-observations communicated by the astronomer-royal attracts our attention, and we trust this is only the beginning of a continuous series. One point, we think, is worth noting. As communicated, they give the mean-

ured Δa and $\Delta\delta$, and then the *combined* correction for differential refraction and parallax. As every computer of the final orbit of a comet wishes to use his own corrected distances in applying the parallax, and as the distances used above are not stated, he must in this case re-compute both the differential refraction and the parallax-factors. It would certainly be better to publish the Δa and $\Delta\delta$ corrected for refraction, and the '$\log p\Delta$,' according to universal custom.

New or variable stars. — Mr. W. H. S. Monck, in the *Observatory*, 1885, 335, makes the suggestion that the new or temporary stars that occasionally appear may be due to swiftly-flying meteor streams in space, meeting a nebula or gaseous mass, either bright or dark, and suddenly heating a part to incandescence, as in the case of shooting stars striking our atmosphere.

Discovery of an asteroid. — A telegram from Professor Pickering announces the discovery on October 27 of a new asteroid, by Perrotin of the Nice observatory. Its position on October 27, at $7^h\ 12^m$, Washington mean time, was: right ascension, $1^h\ 8^m\ 53^s$; declination, $+7°\ 8'$, with daily motions of -36^s in right ascension, and $-7'$ in declination. This is the eighth asteroid discovered this year, and the sixth discovered by Perrotin.

Mr. Chandler's Almucantar.—We recently noted (*Science*, vi. 239) Mr. Chandler's correction to the latitude of the Harvard college observatory from almucantar-observations. Since then he has unquestionably shown (*Astr. nachr.*, 2687) that this instrument is capable of detecting slight errors in the positions of even some of the '*hauptsterne*' of Auwers' system, and of furnishing valuable corrections to them from a comparatively limited number of observations. Mr. Chandler's promised memoir upon the construction, theory, and use of the almucantar will be awaited with unusual interest.

Death of General Baeyer.—Geodesy has lost its most illustrious representative in the death, at the advanced age of 91, of Dr. J. J. Baeyer, founder of the European *Gradmessung*, president of its central bureau and of the Royal Prussian geodetic institute. He died on the night of September 10–11.

NOTES AND NEWS.

According to the report of Superintendent Wear, of the Yellowstone national park, the maintenance of a strict watch day and night has resulted in breaking up, in a measure, the wholesale slaughter of game; and the park is now full of game of all kinds, including about two hundred head of bison, large numbers of elk, and several herds of antelope. By the new roads, access to the objects of interest is facilitated. It is recommended that the force of assistants be increased from ten to fifteen, as the present force is not large enough to prevent the commission of acts of vandalism. The travel in the park this summer has been much greater than ever before.

— President Porter has sent to the corporation his resignation of the presidency of Yale college, the resignation to take effect at Commencement, next June. He will, however, retain his position as Clark professor of moral philosophy.

— King Leopold of Belgium, it is reported, has already found the Kongo Free State a more expensive enterprise than he can carry on unaided. His recent visit to Wiesbaden was made, it is said, for the purpose of inducing some one of the German princes to assume the sovereignty of the Kongo country in his stead.

— R. T. Stupart, the Hudson Bay observer, who abandoned his station at Stupart Bay the day before the steamer Alert reached there, arrived in Halifax on Saturday, Oct. 31, on the steamer Miranda from St. John's, Newfoundland. Their voyage of twelve days in an open boat to Fort Chimo was exceedingly perilous.

— Supplementing the regular course of instruction at Sibley college, Cornell, a series of lectures on mechanical engineering will be delivered from time to time by members of a body of non-resident lecturers who have been chosen from among the most distinguished men of the profession. These gentlemen choose their own subjects, and times of lecture, and their own method of presentation of the subject selected. The director of the college announces that the following named gentlemen are engaged to lecture during the year 1885–86: Dr. E. D. Leavitt, jun., Dr. R. W. Raymond, Dr. C. E. Emory, Mr. Charles T. Porter, Mr. J. M. Allen, Mr. J. C. Hoadley.

— A petition to congress for a deed to San Miguel mountain — an excellent situation for an observatory, near San Diego — has been circulated by the San Diego society of natural history.

— The San Diego society of natural history has taken steps for the protection of the nearly extinct Punis Torreyana of San Diego county.

— The 'Lungen gymnastik' of Th. Huperz is really a handbook on the care and development of the lungs, and the attendant and reflex advantages of such care. Though he says it is for the physician, yet its style and method are such that it may be most successfully used by the laity. The

structure and uses of the organs are just enough dwelt upon to make the subject clear. Besides the common ideas of the injuries of impure air, he tells of the evils of carpets, drapery, curtains, and upholstery as introducing bad air into our living apartments. He comes down heavily on the fear of slight draughts of air. If any adverse criticism is to be made, it is that the author does not make enough of the impure exhalations of the lungs and skin as injuring the air, laying the sin of air-poisoning too much at the door of carbonic acid. And the perils of carbonic oxide, as found in the products of combustion of water gas, are not dwelt upon.

— One of the best compends on its subject that has yet appeared is Edinger's ten lectures 'Ueber den bau der nervösen centralorgane,' just published at Leipzig. The subject is beset with very many difficulties, and there are many controverted points at every step, and many degrees of certainty about what is generally accepted. The author is, moreover, an original investigator, liable to give too great prominence to his own work. Despite all these difficulties, however, we have here without doubt the most lucid and the most judicious presentation of the subject of the finer internal anatomy of the nervous system yet made in so small space. The work contains 120 illustrations, many of them original, which add greatly to its value. We have long needed a concise presentation of this subject, which should include, as none of the larger and well known manuals do, the results of recent investigations, especially those of Meynert and Flechsig, to which full justice is here done. It is sure to prove of peculiar value to teachers. If another lecture could be added on the embryology of the normal brain, the value of the book would be increased.

— E. Wasmandorff has published (Virchow's and Holtzendorf's Sammlung wissenschaftlicher vorträge, ser. xx.) an exhaustive study of the various forms, in which sorrow for the loss of friends has manifested itself among all peoples, ancient and modern, civilized and savage. Fortified by a wealth of references to original sources of information, it constitutes a valuable contribution to anthropological science. It is impossible, within our limited space, to give more than a single example of the author's interesting generalizations. The ordinary colors of mourning garments are black and white. As is the European custom, black prevailed among the ancient Egyptians, Hebrews, Greeks, and Romans, and the native races of this continent. White is the color among the inhabitants of China, Japan, Oceanica and large portions of Asia; so also in parts of Greece and anciently in Germany. Blue is the color in Arabia, and among the Turks and Egyptians, and in Catholic upper Germany it is prescribed by the church. Yellow was used by the ancient Celts and in some of the kingdoms of Asia.

— Several inquiries having been made of us relative to our statement on page 351, that an 'actual competitive examination' was required for admission into the Royal society of London, we print from *Nature* the following extract from Professor Chrystal's address before the British association, which seems to warrant what was said: "I think our great scientific societies — the Royal societies of London and Edinburgh, and the Royal Irish academy — might do more than they do at present to prevent this languishing of local science, which is so prejudicial to the growth of a scientific public. Besides their all-important publishing function, these bodies have for a considerable time back been constituted into a species of examining and degree-conferring bodies for grown-up men, that is to say, their membership has been conferred upon a principle of *exclusion*. Instead of any one being *admitted* who is willing to do his best, by paying his subscription or otherwise, to advance science, every one is *excluded* who does not come up to the standard of a certain examining body. So far is this carried in the case of the Royal society of London, that there is an actual competitive examination, on the result of which a certain number of successful candidates are annually chosen."

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The care of pamphlets.

IN response to the demand which Mr. Goode makes in *Science* of Oct. 16, for descriptions of methods of caring for pamphlets, I describe my own method.

Each pamphlet is perforated at the back with holes to admit a cord. This is most conveniently done with a cutting punch, which makes a round and smooth hole, but it can be done with an awl. Cords are then passed through these holes, and any number of pamphlets may be bound together. Whenever it is desired to insert a new pamphlet, or to rearrange the old, the cords can be withdrawn and re-inserted. To facilitate re-arrangement, all holes are made at exactly the same height above the lower end of the pamphlet. If, then, all the pamphlets on the fauna of a country, for instance, have been bound together temporarily, and it is desired to rearrange them by zoölogical groups with the groups of other faunas, no difficulty in regard to the binding arises from the interchange. These holes are made, for octavos, at 2.5, 7.5, 16, and 21 cm. from the lower edge of the pamphlet; for duodecimos, at 2.5, 7.5, 11, and 16 cm.; for quartos, at 2.5, 7.5, 21, and 26 cm., etc.; so that pamphlets of any two or more

sizes can be bound together. Detailed reasons for this choice of distances may be found in my article entitled 'Standard covers for temporary binding,' in the *Library journal*, Jan., 1883, viii. 6, 7.

Covers for these pamphlets are punched with holes in the hinge or flap at the same distances, so that all covers fit all pamphlets. One or one hundred pamphlets can be inserted in a cover. The backs are made of heavy manila, as wide as the thickness of the book, with a margin folded over to be punched with holes, so that the back is laced between the pamphlets and the cover. By lacing the backs to the covers first, with thread or otherwise, and then inserting the pamphlets on a separate cord, the covers do not fall away when the binding cords are withdrawn. Of course, if desired, the backs can be glued to the covers.

One objection to Mr. Goode's method of having stubs permanently bound in the covers is, that no such re-arrangement can be made as may be desired. The backs are also of definite width, and cannot be enlarged as may be required for convenience. A pamphlet cover made as I recommend, if not tightly laced, will admit of laying in 50 per cent more pamphlets than are tied in, before it is necessary to rebind.

If for any reason it is desired not to mutilate a pamphlet by making holes in it, it can be glued to a stub, or placed in an envelope glued to a stub, and the stub can be perforated.

Manila sheets can be prepared by the thousand, perforated with the standard holes, and newspaper scraps, etc., mounted upon them as desired, and these bound with the pamphlets. By pasting only on the recto, and marking the guide words or symbols on upper left-hand corner of verso, these words or symbols can be readily caught by the eye as the leaves are turned. When scraps occupy more than one sheet, the several sheets can be glued or tied together, so that they may afterward be handled as units. It will be found better in the end to put but one scrap on a sheet, so that the sheets may index themselves in the arrangement.

Next as to the arrangement and classification. The Dewey decimal classification and relative index is pronounced by many of the foremost librarians to be the greatest invention of the century in library economy. Its applicability ranges from that of assisting the school-boy to keep his notes to that of the president of the Royal astronomical society in classifying his library. Its simplicity is that of the Roman alphabet and the Arabic numerals; its comprehensiveness is that of assigning a subject number, for instance, to the 'spherical excess in the computation of a triangulation in geodetic work,' viz., 52,641; or separately indicating 'songs for male voices' (78,487), and 'songs for female voices' (78,488). Its index, in the new edition just issued, contains nearly 9,000 topics, and three tables allow these topics to be developed fully one hundred fold without loss of simplicity. One reference usually suffices to find the subject number of a topic, and by it a set of ten manuscript notes could be marked so that they need not be marked over to locate them in a library of ten thousand volumes, for the symbols would indicate not only what they were about, but where they were.

The use of this system can be seen in my own library and manuscripts, or in the catalogue I am making of the books and pamphlets in the entomological division of the U. S. department of agriculture. A description of the system is given in chapter xxviii. (pp. 623–648) of the special report on libraries published by the U. S. bureau of education in 1876.

I pay about one cent each for my pamphlet covers, octavo or quarto. They are serviceable, but not elegant, but they hardly show on the shelves.

B. Pickman Mann.

Star catalogues.

Would you please tell me where I could obtain a catalogue of the stars, and what would be the cheapest price I would have to pay? H. C. I.

[If our correspondent would state a little more definitely the use for which the catalogue is desired, we should be glad to give the necessary information. A great number of star catalogues are published, no two just alike. The star list of the *American ephemeris* (to be obtained from the office of the *American ephemeris*, Washington, price $1) would perhaps answer his purpose; while, for identifying the constellations, etc., Heis's *Atlas cœlestis novus* would probably be found most useful; and Webb's 'Celestial objects,' giving a valuable list of colored stars, nebulæ, clusters, etc., should be owned by every one that possesses an astronomical telescope. — Ed.]

Calendar reform.

I notice in the supplement to No. 140 an article on reform in our calendar, by Mr. Paul. He refers to two changes in our method of reckoning time proposed by M. Jules Bonjean, one affecting the monthly calendar, the other the weekly.

Changes in the monthly calendar in past time have by no means been infrequent, but of such a capricious character as to result in great irregularities and an inconvenient arrangement. This is a fair subject for reform by way of simplification. But a change or break in the weekly cycle, for the sake of beginning every year with the same nominal day of the week, is quite another affair. Here we should touch upon questions of religious belief, which cannot be discussed in the columns of *Science*.

But the monthly calendar, being of human devising, is open to improvement. In regard to this, M. Bonjean's proposal and my own, in No. 108 (Feb 27), agree in placing the intercalary day at the end of the year, and in making the months to consist alternately of 30 and 31 days. But he would begin the year by giving January 30 days and February 31, and thus proceed. This method would require a change in the number of days in 8 months out of the 12 in ordinary years. But by beginning the first half of the year with a month of 31 days, and the second half with one of 30 days, as in our present calendar, only 3 months would be changed in an ordinary year, including December: and in leap year only February and July. Thus convenience and symmetry would be secured with the least possible change.

Edward P. Gray.

The swindling geologist.

A thief representing himself as Leo Lesquereux, jun., and also as one Strong, son of the geologist who was drowned in this state some years since, has been doing this part of the country of late, making way with geological reports, instruments, and specimens. He has been apprehended, and is now in the jail at

Elkhorn, Walworth county, Wis. His term will expire January 28, or within a day or two of that time. He is the same man who has carried on extensive swindling operations of a similar nature in the east.

Would it not be well to have him 'sent up' as many times as possible? I send you this information, hoping that it may seem wise to you to make his whereabouts known through your widely-circulated columns, and to encourage all interested to make it as warm as possible for this impostor. He very probably assumes other names than those I have given.

He is rather short, of light complexion, has a cynical expression, wears eye-glasses, talks with the greatest freedom of geologists, finding few worthy of recognition or favor. He looks to be thirty years, but represented himself here as forty-six. He told in many places about here, but did not say it here, that he was distributing specimens from the Smithsonian institution. He imposed upon many in that way. He is conversant with geology and geological work, and is certainly well posted on fossil plants.

Prof. N. H. Winchell, Minneapolis; Prof. W. F. Bundy, Whitewater, Wis.; Smith D. Atkins, Freeport, Ill. — are men who know his operations hereabout.

R. D. SALISBURY.

Beloit, Wis., Nov. 2.

Recent Proceedings of Societies.

Academy of natural sciences, Philadelphia.

Oct. 27. — Mr. John A. Ryder made some remarks on a new theory of the development of limbs and their muscles, which he had elaborated in the course of his embryological studies. These have led him to conclusions very similar to those defended by Prof. A. Dohrn and Dr. Paul Meyer, of Naples, though Mr. Ryder's results have been reached quite independently of the European investigators. The new views assume that great modifications of development have been induced by the presence of yolk and by intra-maternal changes. Somewhat modifying Haeckel's views as to the gastrula mouth, the latter is supposed to have become greatly elongated antero-posteriorly. The muscular segments or myotomes are supposed to have been developed from the edge of such a primitive mouth either directly or indirectly, thus giving rise to metameric segments enclosed by the larval skin or epiblast. The muscular segments then push out processes into pockets or folds of the latter to produce the various types of limbs. A large amount of detail was used in illustration and expansion of these views, in the course of which it was shown that the methods of comparative anatomy alone were no longer capable of dealing with many of the more important morphological problems without help from the science of embryology.——Dr. H. C. Wood gave the results of experiments on the effect of injecting gastric juice into the blood of animals. A plan having been devised for indicating graphically the changes in temperature, it was found that an active fever was quickly produced. It was observed that the heat of the body was inverse to the amount of heat given off, thus indicating that fever is a complex process, depending on the relations of heat production and heat dissipation. The action of the pepsin in such cases is not clear, but it probably influences the nerve centres.—— Mr. Lewis Woolman called attention to a very symmetrical bowlder from the neighborhood of Thirty-first street and Haverford avenue, which was quite angular, although associated with rounded pebbles, and which contained on one side impressions of fossils. These were identified by Prof. Heilprin as Orthis and Atrypa spinosa. They were the first Devonian fossils to which his attention had been drawn in this connection.——Instantaneous microscopic photographs, by Mr. D. S. Holman, of Amœbæ, were exhibited. The views show, for the first time, the remarkable changes of form occurring in these organisms in the space of a few seconds.

Natural science association, Staten Island.

Oct. 10. — Mr. Hollick showed plants of the partridge berry (Mitchella repens, L.) bearing peculiar leafy berries, and made the following remarks upon the same: "Last autumn I mentioned finding some of these berries at Tottenville, with green leaves apparently growing out of the top or sides. On first sight these leaves appear like developments of the calyx lobes, but on a close inspection it is seen that the green leaves are growing from expanded petioles, which have tightly clasped the berries to a greater or less extent, and assumed their red color. The line between the berry and its enclosing envelope is not always distinct; but during the winter specimens which had been frozen were examined, and in them the line could be traced far more distinctly, owing to the berry being somewhat shrunken. These berries were kept in water for some time, and, although they and the stem leaves retained their colors perfectly, yet the adventitious leaves soon turned yellow and withered away. During the past summer and present autumn the locality was again searched for fresh specimens, and a number were discovered. In the newly-developed berries, as might be expected, the clasping petioles had not yet assumed the pure red color, many being of a duller red, and some distinctly streaked with green. After having been kept in water for a few days, however, the red became uniform throughout."——Mr. Congdon exhibited a spider covered with a fungoid growth, a species of the genus Achlya, and gave an account of its life history. This fungus is frequently found on insects which have fallen into the water, as in the case of this spider. It begins as a microscopic germ. A small thread next grows out from one side, bifurcating as it extends, until by repeated subdivisions it has formed a complete network of delicate threads It reproduces itself asexually by means of the protoplasm in these threads, which breaks up into little balls, and when ripe is expelled into the water. They swim about for some time by means of ciliæ placed at either end, which finally settle down on the body of the nidus, and in a short time have grown into a plant like the parent.——Mr. W. T. Davis exhibited a deformed specimen of Danais Archippus, the monarch butterfly. On the 6th of August a full grown caterpillar was collected, and, after having transformed to a chrysalis, was removed from its point of suspension and a pin passed through it. This chrysalis was intended for a cabinet specimen, but it was noted as time went on that it gradually changed color, assuming the tints peculiar to the chrysalis before the butterfly emerges. On the 21st of August the butterfly hatched out, having developed about the

pin. This pin passes through the body at or near the second abdominal segment, being very close to the ventral surface.

Microscopical society, New York.

Oct. 2.—G. F. Kunz stated (*Jewellers' circular*) that a necklace was being made by Messrs. Tiffany & Co. of petrified eyes, and that three workmen who were engaged on the necklace had been made suddenly ill, and refused to resume work on such dangerous material. The so-called mummies' eyes are well known, and are, without question, the crystalline lenses of the eyes of a species of cuttlefish (squid). Some of the lenses from the eyes of these cuttlefish measure only 5 mm., but the majority of them are 12mm. in diameter, and some as much as 18mm. The color, really only the result of age, is a dark amber yellow, or golden bronze, externally on the convex side. In all cases they are nearly opaque, and have the appearance of an onion-skin or any other sack like concretion. On the flat side, however, the color is much lighter, and a little play of light is noticeable. The surface is rough, as if an exudation had hardened on it. The structure of the lenses is like that of a pearl,—an aggregation of successive enveloping layers, which are marked on the surface by sets of concentric rings. It is also plain, from these rings, that the lenses are sections, constituting only about one-half of the original lenses of the fish, the intention undoubtedly being to produce additional luminous effect by this series of hemispherical reflectors. The crystalline lens of a human eye would not be so large as even the medium-sized lens exhibited, and is so exceedingly delicate that it can only be preserved at all by the greatest care. In many fishes, and especially the cuttlefish (squid), the lens of the eye contains so much solid matter that it will dry up in a short time, and with very little contraction, into a hard, transparent mass, which would probably be durable. On the contrary, Prof. Raimondi, the ethnologist of Peru, believes these eyes to be human, and Dr. Tschudi of Vienna is said to support him in this theory. The region where these mummy eyes are found is rainless, and the mummies were dried in a sitting posture on the salty sand or the nitre beds, often thousands of them at one place. This being the case, they must have been exposed to the public gaze, and the embalmers would naturally wish to make the appearance of the dead as attractive as possible. Hence it is probable that the cuttlefish eyes, which were inserted into the empty sockets, were cut into two nearly equal parts, in order to obtain greater lustre, and give a natural brightness to the eyes of their dead. The three workmen who were engaged in polishing these eyes were all affected soon after working on them. The sawing and polishing were done at different times, and in each case the same result followed, so that the workmen are confident that their illness was caused by the inhalation of dust during the sawing. The youngest, a boy of sixteen, was taken sick after working only a few hours. His illness consisted of headache, biliousness, and vomiting, and lasted for one day. Another workman, a strong, hearty Frenchman, about forty-five years of age, and weighing nearly 200 pounds, reported that he was taken sick with nausea, sick headache and vomiting, and noticed a disagreeable metallic taste in his mouth during his entire illness, which lasted four days. The other, a German lapidary, about forty years of age, was affected shortly after working at the eyes with an eruption of pimples over his entire body, and when any of the affected parts were rubbed, a swelling immediately arose. This rash was perceptible for over a month. From the fact that these three cases occurred in one workshop, and soon after work was commenced on the eyes, the men very naturally reasoned that the eyes were the cause of their sickness, and expressed a desire not to resume work on them. In response to inquiry, Professor Baird writes that he never heard that poisonous qualities were inherent in the eyes. If they are really poisonous, it surely cannot be from any preparation used to preserve them, for no preservative was necessary, as would have been the case if they were human eyes. It has been observed, however, that, in this case, certain alkaloids may be generated by the decomposition of the organic constituents of the eyes. The United States survey chemists are examining the lenses, to see what alkaloids, if any, are present. As ornaments these eyes are truly beautiful when the exudation on the cut surface has been removed, and they are finely polished. They vary in color from a light yellowish amber tint to a dark yellow, yellowish brown, or rich amber brown, similar to that from Catania, Sicily. In some cases the colors are found in alternated bands, as in the Mexican fire opals from Querertera. Although the reflections lack the play of colors found in the opal, the tints are warmer and more pleasing. The lustre on the uncut rounded sides is pearly. With a proper gold mounting these eyes would give a very beautiful effect in jewelry, although moisture would be likely to injure the polish.

Calendar of Societies.

Biological society, Washington.

Oct. 31.— Col. Marshall McDonald, Fish-culture a necessity for the maintenance of the shad fishery; Mr. Wm. H. Dall, Deep-sea mollusks and the laws illustrated in their development; Mr. Richard Rathbun, Remarks on the Wood's Holl station of the U. S. fish commission; Mr. Romyn Hitchcock, Notes on red snow, with exhibition of specimens.

Engineers' club, Philadelphia.

Oct. 17.—Mr. P. F. Brendlinger, A novel and cheap cement testing machine; Mr. John T. Boyd, The 'Coventry' locomotive boiler; Mr. Walter C. Brooke, Appliances for landing mine cars at the top of slope; Mr. A. Marichal, An instrument for at once describing arcs, of any radii from a few inches to infinity, and for determining the radii of arcs already drawn.

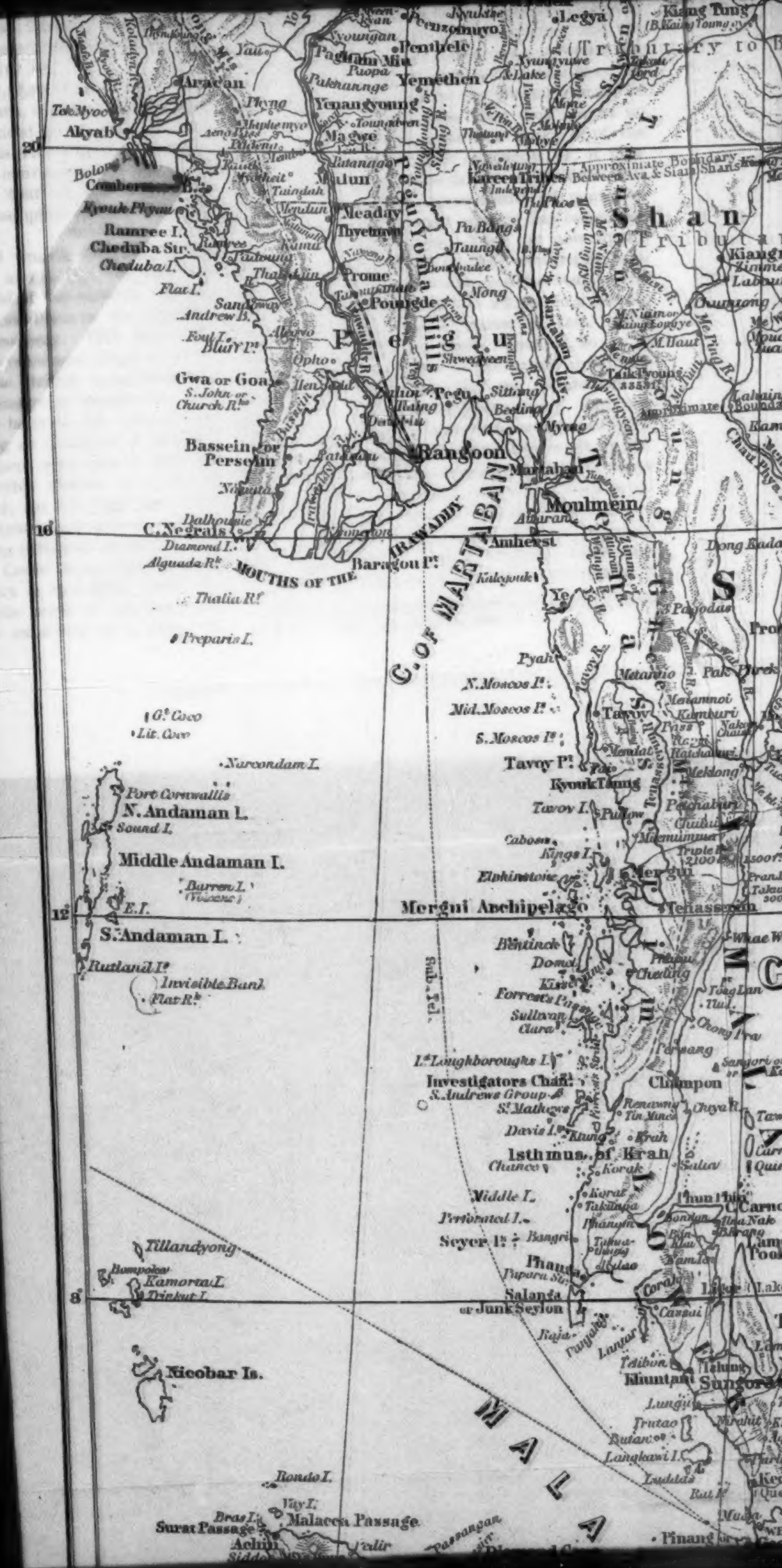
Academy of natural sciences, Philadelphia.

Oct. 27.—Carl H. Eigenman, A review of the American gasterostiedæ; Carl H. Eigenman and Morton W. Fordice, A catalogue of the fishes of Bean Blossom Creek, Monroe co., Indiana; B. W. Everman and Morton W. Fordice, List of fishes collected in Harvey and Cowley counties, Kansas; B. W. Everman and Seth E. Meek, A revision of the American species of the genus Gerres; Seth E. Meek and Robert Newland, A review of the American species of the genus Scorpaena.

BURMA
Shan States
Tributary to Burma
Approximate Boundary Between Ava & Siam Shans
YUN
MANDELAY
Amarapura (late Capital)
Ava
Monein
Toungbain
Theebo
Bamo
Mogaung
Munnipore
Silchar
Jyntea pore
Indepen.t Tipperah
Chittagong
Islamabad
Arracan
Akyab
Cheduba I.
Ramree I.
Kyouk Phyou
Sandoway
Prome
Thyetmyo
Meaday
Magwe
Yenangyoung
Pagham Mio
Yemethen
Pentbele
Toungoo
Pegu
Rangoon
Martaban
Moulmein
Amherst
Bassein or Persein
C. Negrais
Diamond I.
Alguada R.f
Thalia R.f
Preparis I.
Gt. Coco
Lit. Coco
Narcondam I.
Port Cornwallis
N. Andaman I.
MOUTHS OF THE IRAWADDY
G. OF MARTABAN
N. Moscos I.s
Mid. Moscos I.s
S. Moscos I.s
Tavoy P.t
Tavoy I.
Ye
Kiangmai or Zimme
Labbung
Kiang Tung
Legya
Karen Tribes
Gwa or Goa
Baragou P.t
Kalegouk
Pyah
Shwe lee R.
Salween or Lu Kiang River

100°
Yunnan
Tsuhiung
Kwangnan
Kaihwa
Yuenkiang
Lan ngan
Kao bang
Tuyen Kwang
Thai-nuyen
Son-tai
HANOI
Nam-dinh
Ninbin
TONG KING
(TONQUIN)
Son-tai or Red R.
Thanhoa
Vinh
Ha Tinh
C. Bung Kwina
Kwang Tri
Hoï Port & Fort
C. Lay
Tiger I.
HUE (Phu Thua
Touron
Nightingale I.
Luang Phrabang
Kiangmai or Zimme
Labaung
Lao States
Tributary to Siam
Muang Dua
Phitsalok
Nakhon Sawan
S I A M
Korat
Ubon
Bassak
Khong
Sieng Pang
Attopeu
Ayuthia (Siam)
BANGKOK
Bangpa soi
Siemrab
Kwang Nai
Quinhon Harb.
Phuyen

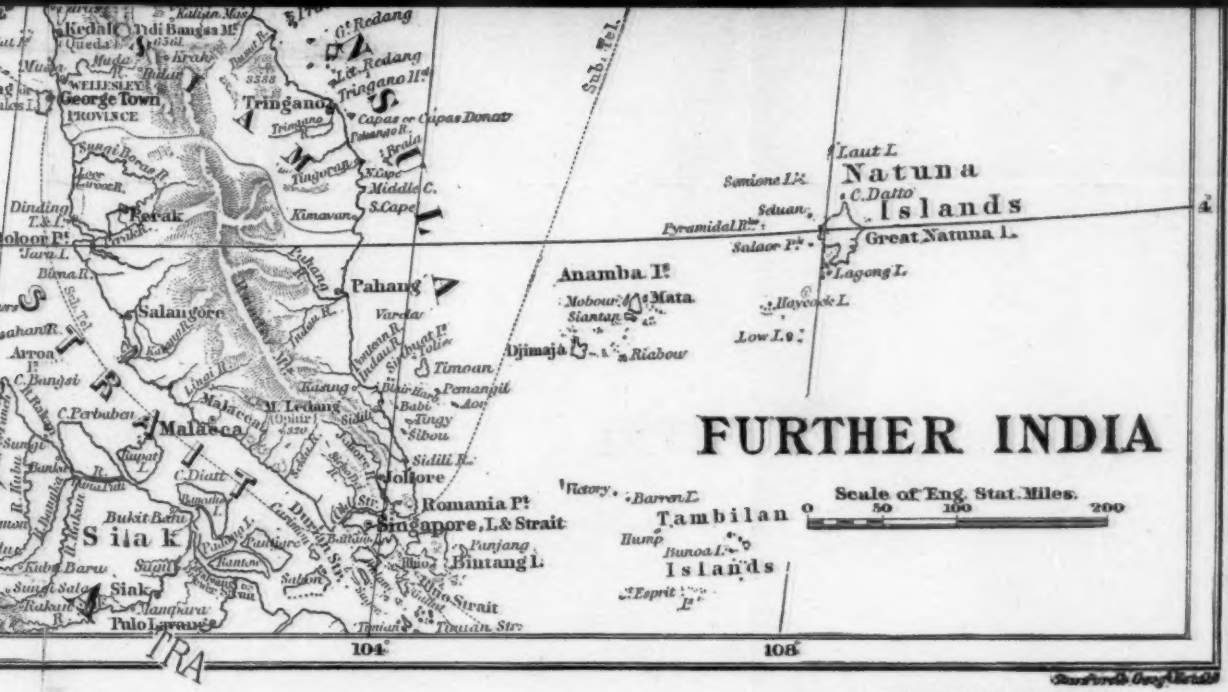

Lien Chau
Peninsula
HAINAN
Kiung Chau
Galong T. & Bay
Touron T. & Bay
Collaocay or Canton I.
C. Batangan
Baubon or Ho Vang
Tamauam R. & P.
Turtle I.
Buffalo I.
C. Sanha
Cambir
Xuan dai, Vung Lam
& Vung Chao Harb.
Phu Thua Tien.



Akyab
Aracan
Cheduba Str.
Cheduba I.
Ramree I.
Flat I.
Sandoway
Andrew B.
Foul I.
Gwa or Goa
S. John or Church Rks
Bassein or Persein
C. Negrais
Diamond I.
Alguada Rk.
MOUTHS OF THE IRAWADDY
Baragou Pt.
Thalia Rf.
Preparis I.
Gt. Coco
Lit. Coco
Narcondam I.
Port Cornwallis
N. Andaman I.
Sound I.
Middle Andaman I.
Barren I. (Volcano)
S. Andaman I.
Rutland It.
Invisible Bank
Flat Rk.
Tillandyong
Kamorta I.
Nicobar Is.
Rondo I.
Malacca Passage
Surat Passage
Achin
Yenangyoung
Magwe
Meaday
Thyetmyo
Prome
Poungde
Pegu
Rangoon
Pegu
Yoma Hills
Martaban
Moulmein
Amherst
C. OF MARTABAN
Shan
Tributary to
Approximate Boundary Between Ava & Siam Shans
Karean Tribes
Pa Bang
Toungoo
Shwegyeen
Sittang
Kiang Tung
Legya
Yemethen
Pyah
N. Moscos Is.
Mid. Moscos Is.
S. Moscos Is.
Tavoy
Tavoy Pt.
Tavoy I.
Cabosa
Kings I.
Elphinstone
Mergui Archipelago
Mergui
Tenasserim
Bentinck
Domel
Kisseraing
Forrest's Passage
Sullivan
Clara
Ld. Loughboroughs I.
Investigators Chan.
S. Andrews Group
St. Mathews
Davis I.
Isthmus of Krah
Chance
Middle I.
Perforated I.
Seyer Is.
Phanga
Salanga or Junk Seylon
Chumpon
Sungora
Pinang
Langkawi I.
Ladda
Rat R.
MALACCA
3 Pagodas


TONG KING
TONQUIN
HANOI
Nam-dinh
Than-hoa
Vinh
Ha Ting
Luang Phrabang
Shan States
Tributary to Siam
Kiangmai or Zimme
Lao States
Tributary to Siam
Me-Khong
Vien chan
Nong-cai
Muang Lom
Phitsalok
Kiang Tung
Muang Nong
Tributary to Burma
Kiang Tsen
Muang Din
Kiang Khang
Lagong
Kamphang
Nakhon Sawan
Pra Bat
Sohai
Korat
Lopburi
Ayuthia or Siam
BANGKOK
Bangpa soi
Kabin
Battambong
Chantabun
SIAM
Chayapume
Kok Prom
Ubon
Amnat
Khemrat
Bassak
Khong
Hutien
Pnom
Bang Muk
Salam
Saravan
Attopeu
Bong Sung
Siang Pang
Sambor
Sambok
Sting Treng
Iron Mines
Siemrab
Bien Ho
GREAT LAKE
Kampong Sarai
Kamnan Tieu
Little Lake
Shanam
Udong
CAMBODIA
PNOM PENH
Kampongsom
Kamput
Chaudoc
Cancao or Hatien
Saigon
Mytho
Bien Hoa
Binh Thuan
LOWER COCHIN CHINA
COCHIN CHINA
ANNAM
TONG KING G.
C. Bung Kwina
Kwang Tri
HUÉ (Phu Thua Tien)
Touron T. & Bay
Ciam or Kwang nan
Kwang Nai
C. Batangan
Quin hon Harb.
Xuan dai, Vung Lam & Vung Chao Harb.
Phuyen
C. Varela
Hon cohe B. I. Harb.
Binkang Bay
Nha Trang
Camranh Bay
Phanran Harb.
C. Padaran
Phan-thit B.
P. Lagan
St. James
MOUTHS OF THE CAMBODIA OR ME KHONG
Condore 1800 ft. high
Brothers
Camao Riv.
Cambodia Pt. (Cambo)
Pulo Obi
Royal Bishops Bk.
Pr. of Wales Bk.
Charlotte Bk.
Moi Country (Independent)
HAINAN
Kiung chau
Nightingale I.
Luichau Peninsula
GULF OF SIAM
MALAY PENINSULA
Samit Pt.
Kampongsom Riv.
Pulo Way or Quang noi
Panjung
Kut I.
Tung
Tantalam I.
Sungora
Patani
C. Patani
Pulo Lozin
Kalantan & R.
Gt. Redang
Lt. Redang
Tringano Id.
Kedah
Queda
C. Carnom
Cameolam
Pook
Koh Krah
Ligor
(Lakon)
Sub. Tel.
16°
12°
8°
20

MAP OF FURTHER INDIA, SHOWING RE



SCIENCE, November 6, 1885.

ING REGIONS INVOLVED BY THE TROUBLES IN UPPER BURMA.